REMARKS

Applicants submit herewith a petition to the Commissioner of Patent and Trademarks to extend the time for response to the Final Office Action dated May 16, 2002, for two months, from August 16, 2002, to October 16, 2002. Check No. 4827 in the amount of $400.00 is enclosed for payment of the time extension fee.

This Amendment is in response to the Final Office Action dated May 16, 2002. Applicant has presented amendments and arguments below that Applicant believes should render the claims allowable. In the event, however, that the Examiner is not persuaded by Applicant's arguments and amendments, Applicant respectfully requests that the Examiner enter the amendments and remarks to clarify issues upon appeal.

Claims 1, 4, 5, 7, 8, 11, 12 and 14 are pending in the present application. Claims 1 and 8 have been amended. Accordingly, claims 1, 4, 5, 7, 8, 11, 12 and 14 remain pending in the present application.

Amended Claims

Applicants have amended independent claims 1 and 8 to to clarify the present invention. No new matter has been presented.

Amended Abstract

Applicant has amended the abstract to conform to the amended claims.

Rejections

Examiner states:

Claims 1, 4-5, 7-8, 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Specification in view of Hook et al. 9US Patent No. 6,083,794).

Claims 1, 4-5, 7-8, 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Specification in view of Chittipeddi et al. (US Patent No. 5,045,486).

Discussion

Applicant incorporates herein by reference all previous amendments and arguments insofar as they are consistent with the amended claims.

Present Invention

A method and system for providing a halo implant to a semiconductor device is disclosed. The method and system comprises providing a thin photoresist layer that is a thickness less than the gate height to the semiconductor device, wherein the thin photoresist layer covers a substantial amount of an active area comprising a source region and a drain region of the semiconductor device. The method and system further includes providing the halo implant to the to the semiconductor device, using the thin photoresist layer as a mask.

Utilizing this thin photoresist layer, taking into account other height variables, the source and drain regions can be opened only as needed. At a 45° angle, the implant can be delivered to all transistors in the circuit in the targeted area as well as getting only a large amount of the dose (up to ¾ of the dose) to the transistor edge which sits on the trench edge.

Referring to Figure 2 of Hook (copy attached), it is clear that Hook neither teaches nor suggests the thickness of a photoresist barrier being less than the gate height as recited in independent claims 1 and 8. Referring to Figure 4 of the present application (copy attached), it shows clearly that the photoresist thickness is less than the gate thickness.

Furthermore, we reiterate Chittipeddi is directed to a process for preventing ion channeling through a gate structure. In Chittipeddi, a layer of photoresist is deposited on top of the gate structure to protect the gate during ion implantation of the source and drain regions. To

minimize shadowing from the gate structure, Chittipeddi teaches reducing the thickness of the photoresist layer to 2000 to 3000 Angstroms. (Col. 5, lines 12-18).

Chittipeddi fails to teach or suggest covering "a substantial amount of an active area comprising *a source region and a drain region*" with the thin photoresist layer, as recited in claims 1 and 8. As shown in Figure 5 of Chittipeddi, only the gate structure 17 is covered by the photoresist layer 19. The photoresist layer 19 actually serves to define the gate structure in the proceeding process step (Col. 4, lines 55-58), which is left intact to protect the gate structure during the subsequent formation of the source and drain regions. Thus, Chittipeddi's photoresist layer does not cover "a substantial amount of an active area comprising *a source region and a drain region*," as recited in claims 1 and 8.

In addition, Chittipeddi fails to teach or suggest using the thin photoresist layer "as a mask" for the halo implant. As stated above, the photoresist layer serves to protect the gate structure during ion implantation of the source and drain regions (col. 5, lines 6-12). At most, the photoresist layer is a mask for the source and drain regions. Unlike the present invention, however, Chittipeddi's photoresist layer is not a mask for the halo implant.

Accordingly, Applicants' Specification in view of Chittipeddi or Hookfails to teach or suggest the combination of elements disclosed in the present invention, as recited in claims 1 and 8. Applicants respectfully submit that claims 1 and 8 are allowable over the cited references. Claims 4, 5, 7, 11, 12 and 14 depend from claims 1 and 8, respectively, and therefore the above arguments apply with full force and effect to claims 4, 5, 7, 11, 12 and 14. Applicants respectfully submit that claims 4, 5, 7, 11, 12 and 14 are also allowable over the cited references.

Conclusion

In view of the foregoing, it is submitted that claims 1, 4, 5, 7, 8, 11, 12 and 14, as now presented, are allowable over the cited references and are in condition for allowance. Applicants respectfully request reconsideration of the rejections and objections to the claims.

Applicants' attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicants' attorney at the telephone number indicated below.

Attached hereto and captioned "**Version with Markings to Show Changes Made**" is a marked-up version of the changes made to the specification and the claims by the current amendment.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Twice Amended) A method for providing a halo implant to a semiconductor device, the semiconductor device including a gate thereon, the method comprising the steps of:

(a) providing a thin photoresist layer to the semiconductor device, wherein the thin photoresist layer is [between approximately 0.1 to 0.2μm thick] a thickness less than the gate height and covers a substantial amount of an active area comprising a source region and a drain region of the semiconductor device; and

(b) providing the halo implant to the semiconductor device, wherein the thin photoresist layer is used as a mask.

8. (Thrice Amended) A system for providing a halo implant to a semiconductor device comprising:

means for providing a thin photoresist layer to the semiconductor device, wherein the thin photoresist layer is [between approximately 0.1 to 0.2μm thick] a thickness less than the gate height and covers a substantial amount of an active area comprising a source region and a drain region of the semiconductor device; and

means for providing the halo implant to the semiconductor device, wherein the thin photoresist layer is used as a mask.

IN THE ABSTRACT

A method and system for providing a halo implant to a semiconductor device is disclosed.

The method and system comprises providing a thin photoresist layer [between approximately 0.1 to 0.2μm thick] that is a thickness less than the gate height to the semiconductor device, wherein the thin photoresist layer covers a substantial amount of an active area comprising a source region and a drain region of the semiconductor device. The method and system further includes providing the halo implant to the to the semiconductor device, using the thin photoresist layer as a mask.

Utilizing this thin photoresist layer, taking into account other height variables, the source and drain regions can be opened only as needed. At a 45° angle, the implant can be delivered to all transistors in the circuit in the targeted area as well as getting only a large amount of the dose (up to ¾ of the dose) to the transistor edge which sits on the trench edge.